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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/224,759	01/04/1999	TOSHIHARU FURUKAWA	BU9-98-179	3284

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SCHMEISER OLSEN & WATTS
18 E UNIVERSITY DRIVE
SUITE # 101
MESA, AZ 85201

EXAMINER

GARCIA, JOANNIE A

ART UNIT PAPER NUMBER

2823

DATE MAILED: 12/03/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/224,759

Applicant(s)

FURUKAWA ET AL

Examiner

Joannie A Garcia

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is FINAL. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,2,4-10,14,15,17,23,24,36-51 and 53 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 53 is/are allowed.
- 6) ☒ Claim(s) 1,2,4-10,14,15,17,23,24, and 36-51 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

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The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

Claims 1, 2, 4-10, 14, 15, 17, 23, 24, and 36-51, are rejected under 35 U.S.C. 103(a) as being unpatentable over Mase et al, and further in view of Moslehi et al (U.S. Patent 4,715,937).

Mase et al teaches forming a plurality of polysilicon portions of gate conductors 14 on a substrate having a semiconductor portion 80 (Figure 7, Column 9, lines 60-67, and Column 10, lines 35-52), trimming at least an electrically significant portion of the polysilicon portion by a selective film growth method, such as selective surface nitridation (Figures 4 and 8, Column 10, lines 53-55, and Column 11, lines 3-5), compensating n-channel and p-channel devices (Column 6, lines 54-60, and Column 12, lines 47-50), at least partially removing the trimming film (Column 11, lines 3-5), anisotropically etching the trimming film to form gate conductor spacers 13 (Figures 4 and 8, Column 11, lines 9-27), and forming an additional oxide layer 17 on the trimming film (Figure 7, Column 6, lines 17-22, Column 9, lines 60-67, and Column 11, lines 28-31). (Column 10, lines 15-34, and Column 11).

Mase et al does not teach performing the selective surface nitridation exposing structures formed on the semiconductor portion to 50-1000 expose pulses of laser irradiation with an energy fluence of 200-700 mJ/cm² in the presence of ammonia at a pressure of 10-1500 Torr, performing the selective surface nitridation exposing structures formed on the semiconductor portion to 150 expose pulses of 308 nm laser irradiation with an energy fluence of 400-500 mJ/cm² in the presence of ammonia at a pressure of 300-500 Torr, wherein ammonia is supplied

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at about 100 ccm/min, and trimming the polysilicon portion to a depth within the range of 10 to 100 nanometers.

Moslehi et al discloses the use of laser and ammonia for growing thermal nitrides of silicon (Column 1, lines 21-31). It would have been within the scope of one ordinary skill in the art to combine the teachings of Moslehi et al and Mase et al to enable the gate conductor trimming step to be performed and also to obtain an ultra-thin, high quality insulators (Moslehi et al, Column 1, lines 15-18).

It would have been a matter of routine optimization within the teachings of Moslehi et al and Mase et al to determine suitable expose pulses, depth, energy, pressure, and flow to achieve Mase's et al trimmed gate conductor step.

Applicant argues that Mase et al cannot be combined with Moslehi et al, that Moslehi can grow nitrides of only 25 angstroms or less in thickness, and that Moslehi et al cannot form a silicon nitride film of the thickness required by Mase et al. However, Moslehi et al et al discloses forming insulators of 200 angstroms thick (Column 1, lines 15-18), therefore, forming a silicon nitride film of the thickness required by Mase et al.

Claim 53 is allowed.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist whose telephone number is (703) 308-0956. **See MPEP 203.08.**

Any inquiry concerning this communication or earlier communications from the examiner should be directed to examiner J. Garcia whose telephone number is (703) 306-5733. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703) 306-2794. The fax number for this group is (703) 308-7722 (and 7724), and (703) 305-3431 (and 3432). MPEP 502.01 contains instructions regarding procedures used in submitting responses by facsimile transmission.


JAG
11/26/03


George Fourson
Primary Examiner